

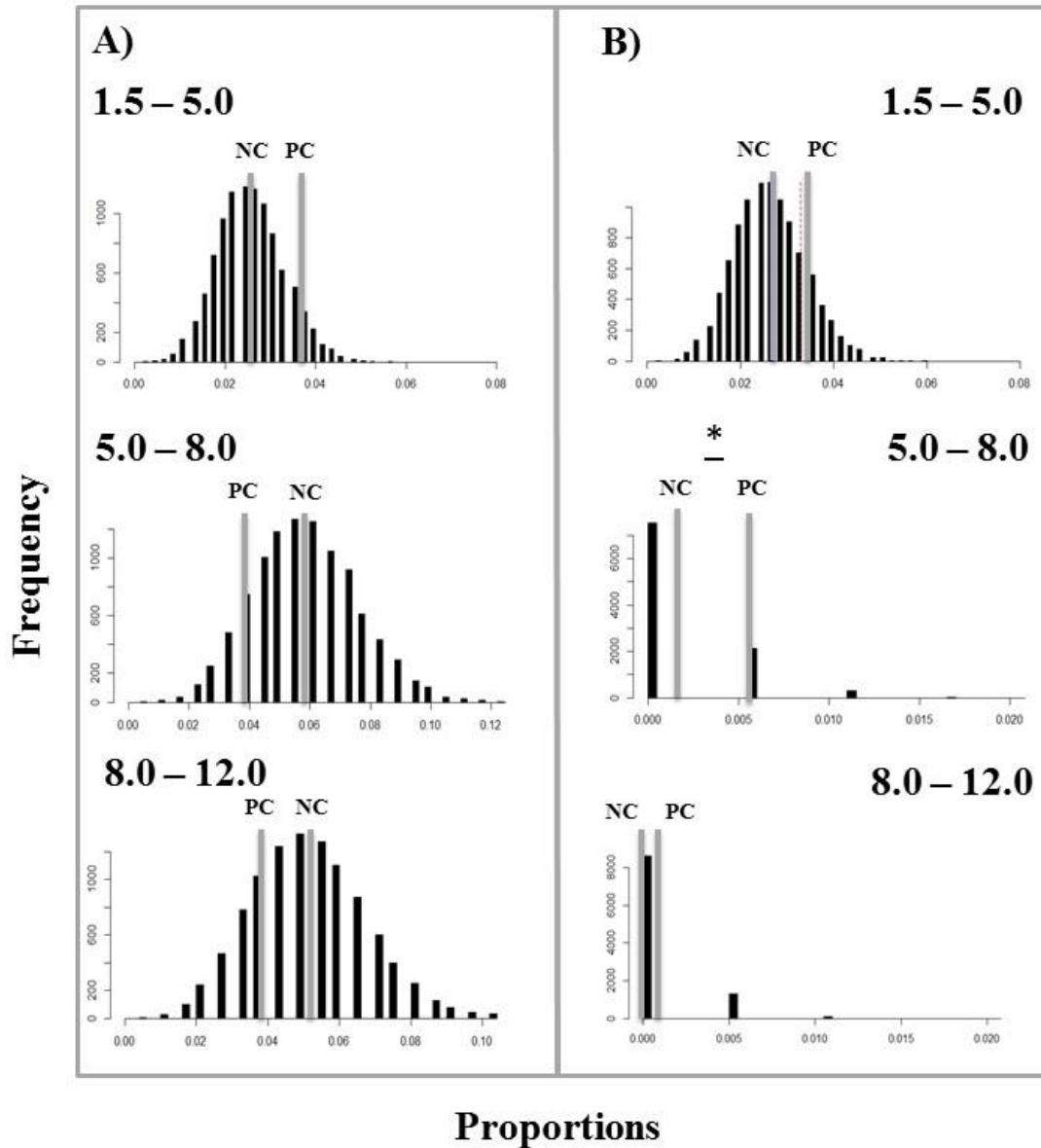
## Appendix 1: Chapter 2 Supplementary Material

### *Supplemental Tables*

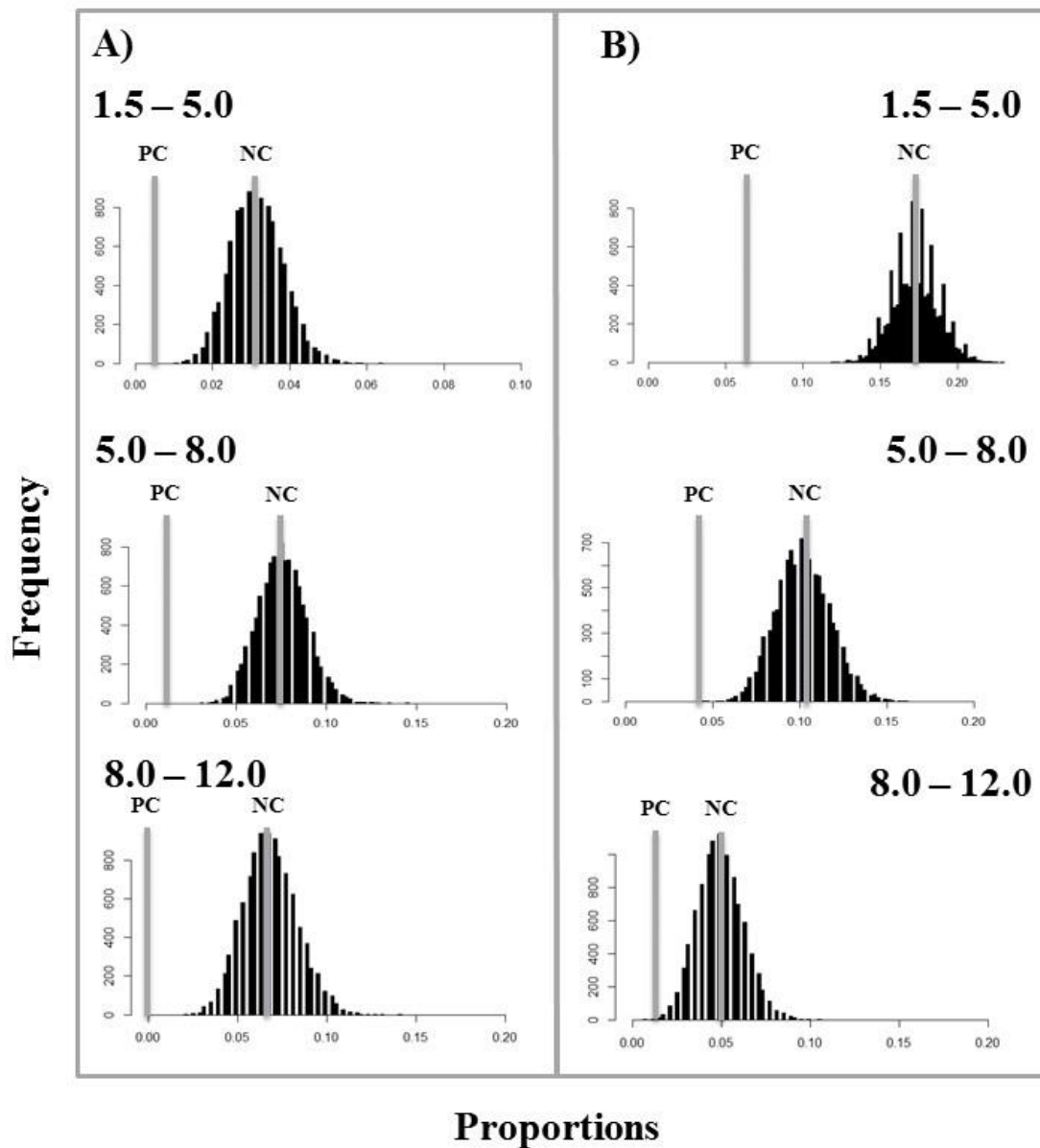
<b>Focal Immature ID</b>	<b>Sex</b>	<b>Age Categories Included</b>	<b># PC Interactions</b>
BRZ	M	1.5 - 5.0	1
DIA	F	5.0 - 8.0	1
ERI	M	1.5 - 5.0	12
FAD	F	1.5 - 5.0	1
FAM	F	5.0 - 8.0	2
FE	M	1.5 - 5.0, 5.0 - 8.0	4
FFT	M	1.5 - 5.0	2
FLI	F	1.5 - 5.0	10
FND	M	1.5 - 5.0, 5.0 - 8.0	11
FO	M	1.5 - 5.0	3
FS	F	1.5 - 5.0, 5.0 - 8.0	2
FU	M	1.5 - 5.0, 5.0 - 8.0	6
GA	F	1.5 - 5.0, 5.0 - 8.0	10
GD	M	1.5 - 5.0, 8.0 - 12.0	11
GIM	M	5.0 - 8.0	1
SAF	F	1.5 - 5.0	1
SDB	M	1.5 - 5.0	1
SL	M	8.0 - 12.0	1
SN	M	1.5 - 5.0	5
SR	F	1.5 - 5.0, 5.0 - 8.0	5
TAB	F	1.5 - 5.0, 5.0 - 8.0	5
TG	F	1.5 - 5.0	2
TN	M	1.5 - 5.0, 5.0 - 8.0	6
TOM	M	8.0 - 12.0	2
TZN	M	1.5 - 5.0	1
ZEL	F	8.0 - 12.0	3
ZIN	M	1.5 - 5.0	5

**Supplemental Table 1. Focal immature subjects and TPA sample sizes included in the analyses.**

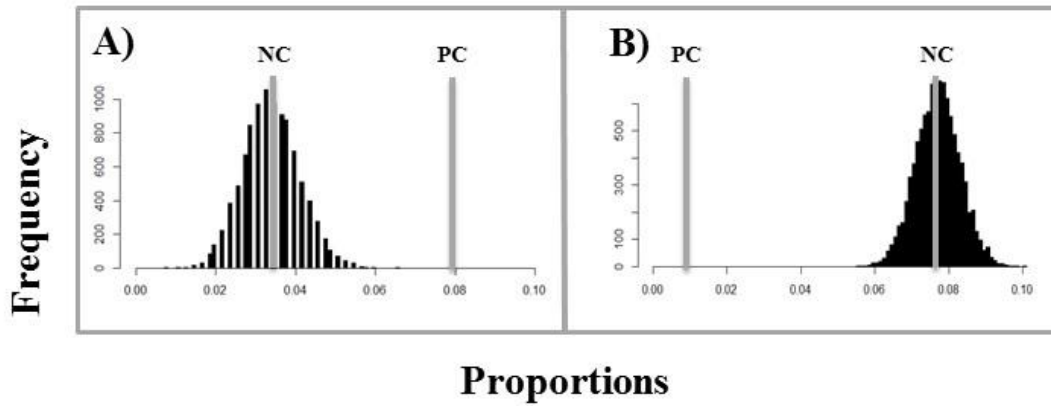
Supplemental Figures



Supplemental Figure 1. Histogram of 10,000 proportions of non-conflict intervals in which an immature A) groomed or B) played with his/her mother obtained from a randomization procedure for individuals of age class 1.5 – 5.0, 5.0 – 8.0, 8.0 – 12.0. PC = Average proportion of PC intervals in which the mother was groomed or played with. NC = Bootstrapped mean of proportions in which the mother was groomed or played with in a random non-conflict interval.



**Supplemental Figure 2. Histogram of 10,000 proportions of non-conflict intervals in which an immature A) groomed or B) played with a non-mother obtained from a randomization procedure for individuals of age class 1.5 – 5.0, 5.0 – 8.0, 8.0 – 12.0 years old. PC = Average proportion of PC intervals in which the non-mother was groomed or played with. NC = Bootstrapped mean of proportions in which the non-mother was groomed or played with in a random non-conflict interval.**



**Supplemental Figure 3. Histogram of 10,000 proportions of non-conflict intervals in which mothers groomed A) offspring and B) non-offspring. PC = Average proportion of PC intervals in which an offspring or non-offspring was groomed. NC = Bootstrapped mean of proportions in which an offspring or non-offspring was groomed in a random non-conflict interval.**

## Appendix 2: Chapter 3 Supplementary Material

### *Supplementary Tables*

<b>Behavior</b>	<b>Definition</b>	<b>Key Words</b>
Aggression	Any directed threat, directed display, chase or attack observed between two or more individuals of any age. <sup>1</sup>	Hit, chase, display at, bite, hit, attack, kick, slap, injure, fight
Third Party Policing Behaviors	An individual interrupts the conflict without taking sides (i.e., demonstrated no affiliative or agonistic behaviors towards a combatant) via behaviors including walking or running through the conflict, displaying past opponents, and approaching the conflict with bristled hair.	Bristle towards commotion, bristle to stop conflict, bristle and approach the conflict, display to stop, display through conflict, display towards conflict, display past conflict, interfere, opponents stop fighting, stop, stop the fight, scatter opponents, rush towards commotion
Non-policing Third Party Behaviors	Affiliative or aggressive interaction directed towards one of the combatants	Affiliative: Beg, grasp, groom, embrace, touch, offer support, side with Aggressive: Attack, gang up on, chase, hit, display at, bite, scream, waa bark

**Supplemental Table 1. Ethogram of behaviors included in the study with key terms used in coding procedures. <sup>1</sup> Goodall 1986.**

<b>Policer Sex</b>	<b>N Policed events involving maternal offspring</b>	<b>N Policed events involving maternal kin</b>	<b>N Policed events involving non-maternally related individuals</b>	<b>N Policed events total</b>
Female	16	1	0	17
Male	NA	12	37	49

**Supplemental Table 2. Breakdown of policing involving an immature according to sex of policing individual and maternal relationships.**

<b>Sex-Dyad Type</b>	<b>Severity</b>	<b>N Aggression Events Policed</b>	<b>N Aggression Events Total</b>	<b>% of Aggression Events Policed</b>
<b>All</b>	Not Severe	51	2302	2.22
	Severe	61	1101	5.54
	<b>Total</b>	<b>112</b>	<b>3403</b>	<b>3.29</b>
<b>Female</b>	Not Severe	10	89	11.24
	Severe	14	88	15.91
	<b>Total</b>	<b>24</b>	<b>177</b>	<b>13.56</b>
<b>Male</b>	Not Severe	20	1249	1.60
	Severe	16	389	4.11
	<b>Total</b>	<b>36</b>	<b>1638</b>	<b>2.20</b>
<b>Mixed</b>	Not Severe	21	964	2.18
	Severe	31	624	4.97
	<b>Total</b>	<b>52</b>	<b>1588</b>	<b>3.27</b>

**Supplemental Table 3. Breakdown of policing dyadic aggression between mature individuals according to sex of combatants and severity of aggression event. % of aggressive events policed = (N events policed between individuals of a given age category / N aggression events total between individuals of a given age category) x 100.**

<b>Ordinal Rank of Male Policer</b>	<b>N Aggression Events Policed</b>
1	4
2	3
3	6
4	10
5	3
6	4
7	8
8	17
9	13
10 - 14	26

**Supplemental Table 4. Breakdown of policing by adult males according to rank of the policer**

<b>Age Range of Male Policer</b>	<b>N Aggression Events Policed</b>
12 - 18	9
19 - 25	57
26 - 32	23
$\geq 33$	5

**Supplemental Table 5. Breakdown of policing by adult males according to age of the policer**

### **Appendix 3: Chapter 4 Supplementary Material**

#### *Supplementary Text*

##### **Supplementary Text 1. Summary of Fission-Fusion Metrics across Bins**

The mean proportion of the community represented in parties in a given bin was 0.295 ( $\pm 0.076$  SD; range 0.14 – 0.42). The mean duration of time spent in parties without a change in composition was 2.57 ( $\pm 0.482$  SD; range 1.72 – 3.48) hours. The mean rate of change in party composition was 0.041 ( $\pm 0.008$  SD; range 0.028 – 0.059) per hour.

##### **Supplementary Text 2. Summary of Social Relationship Metrics across Bins**

The mean modularity across study bins was 0.325 ( $\pm 0.048$  SD; range 0.172 – 0.432). The average mean normalized degree across study bins was 0.489 ( $\pm .079$  SD; range 0.363 – 0.688). The average transitivity across study bins was 0.558 ( $\pm 0.070$  SD; 0.438 – 0.734). The average mean degree strength across study bins was 0.570 ( $\pm 0.080$  SD; range 0.395 – 0.766).



*Supplementary Tables*

<b>Period</b>	<b>Season</b>	<b>N Aggression Events</b>	<b>N Aggression Events Policed</b>	<b>N Hours of Observation</b>	<b>Hourly Aggression Rate</b>	<b>Proportion of Aggressive Events Policed</b>
1	Dry	71	1	1237	0.057	0.014
2	Wet	95	6	1098	0.087	0.063
3	Dry	136	7	1440	0.094	0.051
4	Wet	189	10	1352	0.140	0.053
5	Dry	143	5	1261	0.113	0.035
6	Wet	156	11	1186	0.132	0.071
7	Dry	140	5	1147	0.122	0.036
8	Wet	163	6	1470	0.111	0.037
9	Dry	110	1	1229	0.089	0.009
10	Wet	234	6	1434	0.163	0.026
11	Dry	71	1	931	0.076	0.014
12	Wet	116	5	848	0.137	0.043
13	Dry	125	4	1103	0.113	0.032
14	Wet	87	0	1159	0.075	0
15	Dry	177	3	1221	0.145	0.017
16	Wet	278	3	1558	0.178	0.011
17	Dry	110	5	1135	0.097	0.045
18	Wet	121	0	990	0.122	0
19	Dry	322	7	1473	0.219	0.022
20	Wet	122	1	1370	0.089	0.008
21	Dry	68	0	694	0.098	0
22	Wet	220	4	1425	0.154	0.018
23	Dry	174	4	1305	0.133	0.023
24	Wet	190	6	1209	0.157	0.032
25	Dry	119	3	941	0.126	0.025
26	Wet	165	3	1050	0.157	0.018
27	Dry	228	8	1249	0.183	0.035
28	Wet	303	5	1299	0.233	0.017
29	Dry	168	3	792	0.212	0.018
30	Wet	105	2	858	0.122	0.019
31	Dry	70	1	722	0.097	0.014
32	Wet	50	0	585	0.085	0
33	Dry	86	0	702	0.122	0
34	Wet	176	3	1072	0.164	0.017
35	Dry	122	2	1150	0.106	0.016

36	Wet	195	6	1227	0.159	0.031
37	Dry	152	1	1122	0.136	0.007

**Supplementary Table 1. Data summaries of observed rates of aggression and proportion of aggressive events policed in each six-month bin included in the study period.**

Chimp ID	Chimp Sex	N Aggressive Events Witnessed	N Aggressive Events Policed	% Aggressive Events Policed
AO	M	2589	11	0.004
BE	M	1258	7	0.006
FD	M	2657	53	0.020
FE	M	1503	21	0.014
FF	F	1135	6	0.005
FN	F	2156	5	0.002
FO	M	1889	11	0.006
FR	M	2615	49	0.019
FU	M	515	2	0.004
GB	M	1444	21	0.015
GL	M	1719	6	0.003
GM	F	1756	12	0.007
JF	F	1138	2	0.002
KS	M	2228	22	0.010
MAK	F	473	1	0.002
PF	M	615	4	0.007
PI	F	609	6	0.010
PX	M	2857	3	0.001
SA	F	1616	3	0.002
SL	M	2453	15	0.006
SN	M	560	2	0.004
SW	F	1893	3	0.002
TB	M	2676	11	0.004
TG	F	1016	3	0.003
TN	M	1084	9	0.008
TZ	F	1693	3	0.002
WL	M	2661	12	0.005

**Supplementary Table 2. Observed proportion of aggressive events policed according to individual policers.**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	0.0135	0.008	1.609	0.118
Proportion of Aggression Events Policed	-0.002	0.009	-0.277	0.784
Community Size	-0.005	0.002	-2.419	0.022*
Proportion of Observation Days on which an Estrous Female was Present	0.335	0.055	6.072	<0.001***
Season <sup>a</sup>	0.038	0.015	2.468	0.019*

**Supplementary Table 3. Results for a model that examined the outcome of mean proportion of community represented in parties. Model  $R^2 = 0.742$ ,  $F_{5,31} = 17.81$ ,  $p < .002$ . <sup>a</sup>Dry season was the reference category**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	-0.096	0.097	-0.993	0.328
Proportion of Aggression Events Policed	0.038	0.098	0.388	0.701
Community Size	-0.008	0.023	-0.360	0.722
Proportion of Observation Days on which an Estrous Female was Present	1.131	0.636	1.779	0.085
Season <sup>a</sup>	0.086	0.175	0.490	0.628

**Supplementary Table 4. Results for a model that examined the outcome of mean length of time in unchanging parties. Model  $R^2 = 0.160$ ,  $F_{5,31} = 1.177$ ,  $p = 0.343$ . <sup>a</sup>Dry season was the reference category.**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	0.0009	0.001	0.642	0.526
Proportion of Aggression Events Policed	-0.001	0.001	-0.867	0.393
Community Size	0.0003	0.0003	0.860	0.396
Proportion of Observation Days on which an Estrous Female was Present	-0.027	0.009	-2.902	0.007**
Season <sup>a</sup>	-0.0009	0.003	-0.365	0.717

**Supplementary Table 5. Results for a model that examined the outcome of mean rate of change in party composition. Model  $R^2 = 0.326$ ,  $F_{5,31} = 2.995$ ,  $p < 0.050$ . <sup>a</sup>Dry season was the reference category.**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	-0.009	0.013	-0.681	0.501
Proportion of Aggression Events Policed	0.007	0.013	0.533	0.598
Community Size	-0.009	0.003	-2.838	0.008**
Proportion of Observation Days on which an Estrous Female was Present	-0.038	0.086	-0.439	0.664
Season <sup>a</sup>	0.022	0.024	0.915	0.367

**Supplementary Table 6. Results for a model that examined the outcome of mean normalized degree. Model  $R^2 = 0.742$ ,  $F_{5,31} = 17.81$ ,  $p < 0.002$ . <sup>a</sup>Dry season was the reference category.**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	-0.005	0.013	-0.378	0.708

Proportion of Aggression Events Policed	0.009	0.013	0.672	0.507
Community Size	-0.009	0.003	-2.746	0.010**
Proportion of Observation Days on which an Estrous Female was Present	0.133	0.085	-1.564	0.128
Season <sup>a</sup>	0.027	0.023	1.170	0.251

**Supplementary Table 7. Results for a model that examined the outcome of transitivity. Model  $R^2 = 0.446$ ,  $F_{5,31} = 4.989$ ,  $p < 0.002$ . <sup>a</sup>Dry season was the reference category.**

<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	0.003	0.015	0.173	0.864
Proportion of Aggression Events Policed	0.027	0.015	1.821	0.078
Community Size	0.010	0.004	2.883	0.007**
Proportion of Observation Days on which an Estrous Female was Present	-0.049	0.097	-0.500	0.621
Season <sup>a</sup>	0.034	0.028	1.262	0.217

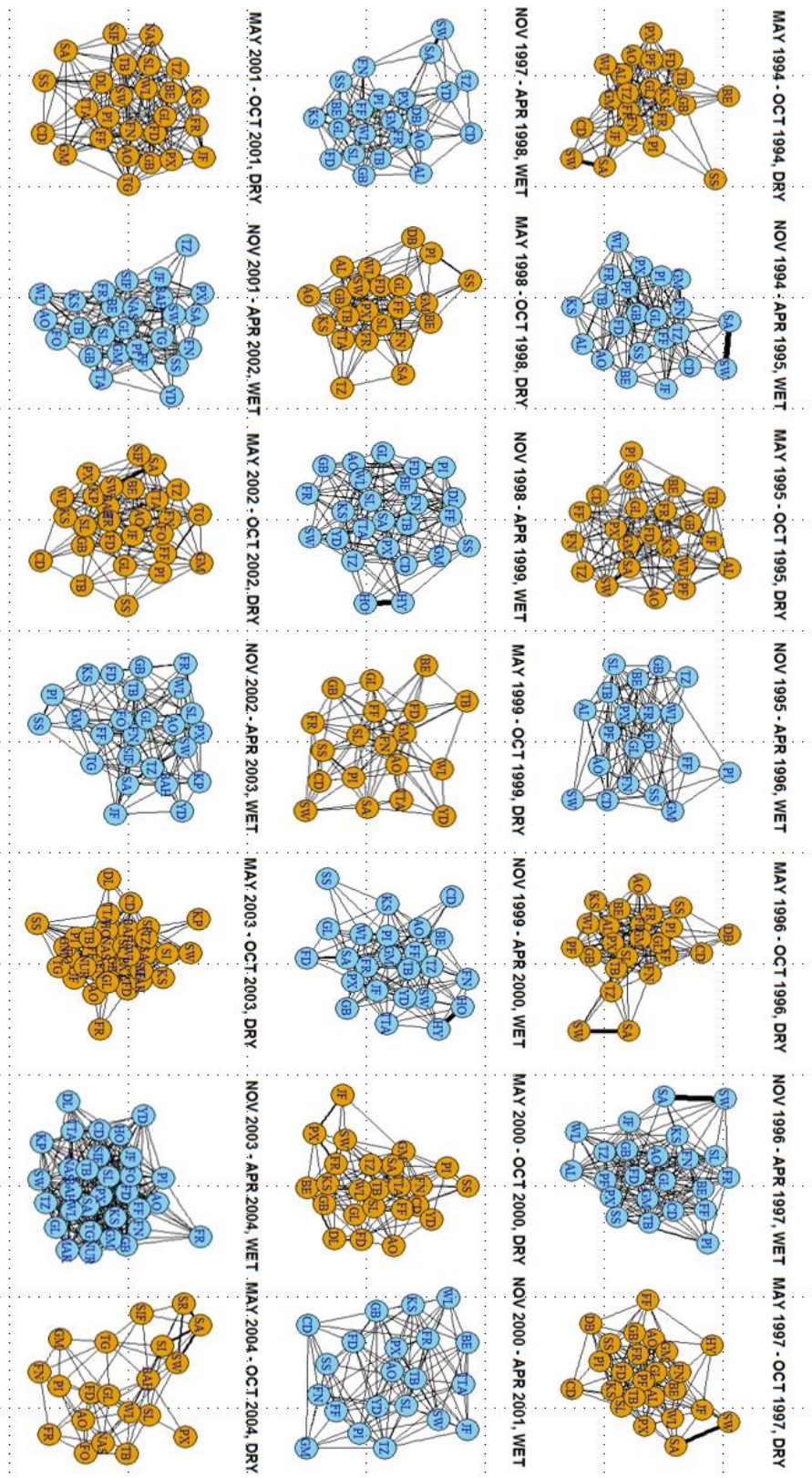
**Supplementary Table 8. Results for a model that examined the outcome of mean degree strength. Model  $R^2 = 0.303$ ,  $F_{5,31} = 2.691$ ,  $p < .050$ . <sup>a</sup>Dry season was the reference category.**

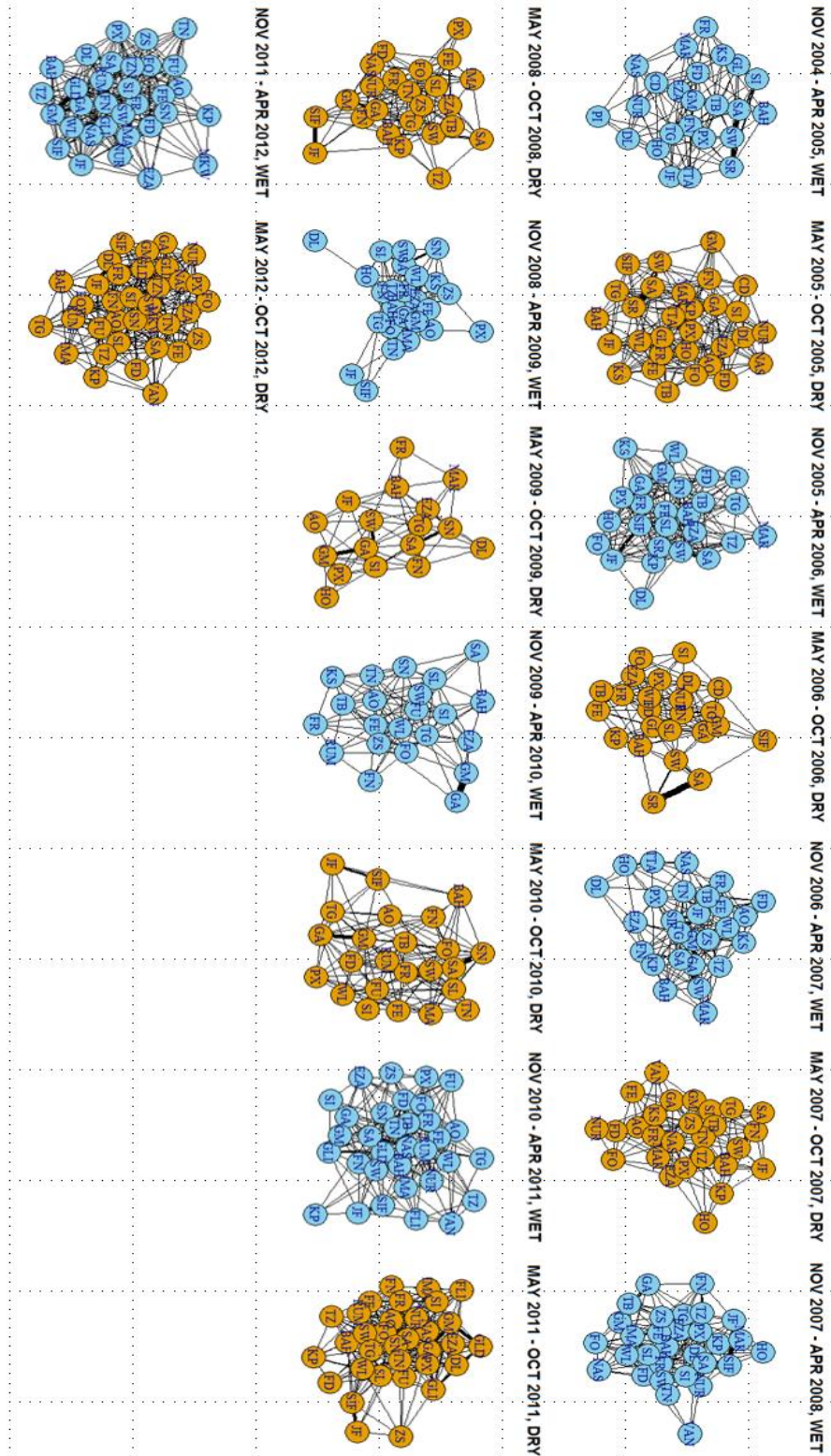
<b>Variable</b>	<b>Estimate</b>	<b>Standard Error</b>	<b>t value</b>	<b>p value</b>
Rate of Aggression	-0.008	0.009	-0.886	0.383
Proportion of Aggression Events Policed	0.007	0.009	0.749	0.459

Community Size	0.007	0.002	3.432	0.002**
Proportion of Observation Days on which an Estrous Female was Present	-0.008	0.057	-0.139	0.890
Season <sup>a</sup>	-0.009	0.016	-0.573	0.571

**Supplementary Table 9. Results for a model that examined the outcome of modularity. Model  $R^2 = 0.329$ ,  $F_{5,31} = 3.041$ ,  $p < 0.050$ . <sup>a</sup>Dry season was the reference category.**

*Supplementary Figures*





**Supplementary Figure 1. Visualization of social networks derived from DAIs of joint arrival data for all bins included in the analysis. Blue = wet season, Orange = dry season.**